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Informal Report

Geology of the 241-TY Tank Farm

April 1976

W. H. Price

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Environmental Engineering Section
Research Department
Research and Engineering Division

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Atlantic Richfield Hanford Company
Richland, Washington 99352

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GEOLOGY OF THE 241-TY TANK FARM

by

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ATLANTIC RICHFIELD HANFORD COMPANY
RICHLAND, WASHINGTON 99352

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INTRODUCTION

A series of maps have been compiled to document the structure and stratigraphy of the sediments underlying the high-level radioactive waste storage tank farms located within the ERDA Hanford Reservation. The primary purpose of these maps is to provide basic geologic information to be utilized to evaluate the impact of suspected and confirmed tank leaks. For convenience of usage map sets for each tank farm have been published in separate document packets (see Table I). The contents of this packet (see Table II) contain maps compiled only for the 241-TY Tank Farm.

TABLE I

TANK FARM GEOLOGY DOCUMENTS AVAILABLE
AS OF APRIL, 1976*

Title	Document Number
Geology of the 241-A Tank Farm	ARH-LD-127
Geology of the 241-AX Tank Farm	ARH-LD-128
Geology of the 241-B Tank Farm	ARH-LD-129
Geology of the 241-BX Tank Farm	ARH-LD-130
Geology of the 241-BY Tank Farm	ARH-LD-131
Geology of the 241-C Tank Farm	ARH-LD-132
Geology of the 241-S Tank Farm	ARH-LD-133
Geology of the 241-SX Tank Farm	ARH-LD-134
Geology of the 241-T Tank Farm	ARH-LD-135
Geology of the 241-TX Tank Farm	ARH-LD-136
Geology of the 241-TY Tank Farm	ARH-LD-137
Geology of the 241-U Tank Farm	ARH-LD-138
Generalized Geology of the 241-SY Tank Farm	ARH-LD-139

*Additional documents will be completed as new tank farms are built and well monitoring networks installed.

TABLE II

241-TY TANK FARM GEOLOGY MAPS

Title	Drawing Number
241-TY Tank Farm Geologic Map Legend and Plot Plan	H-2-38989
241-TY Tank Farm Geologic Characterization Cross Section A-A'	H-2-70509
241-TY Tank Farm Geologic Characterization Cross Section B-B'	H-2-70510
241-TY Tank Farm Geologic Characterization Cross Section C-C'	H-2-70511
241-TY Tank Farm Geologic Characterization Cross Section D-D'	H-2-70512
241-TY Tank Farm Geologic Characterization Cross Section E-E'	H-2-70513
241-TY Tank Farm Geologic Characterization Cross Section F-F'	H-2-70514
241-TY Tank Farm Geologic Characterization Cross Section G-G'	H-2-70515
241-TY Tank Farm Geologic Characterization Base of Backfill	H-2-70508
241-TY Tank Farm Geologic Characterization Paleotopography of Silt Horizon	H-2-70507

PROCEDURES

During the drilling of 16 dry wells and 4 water wells in and around the 241-TY Tank Farm, sediment samples were collected from one to 5-foot depth intervals. Information utilized to prepare this series of maps was obtained by the analysis of these samples, numbering approximately 250.

Each sediment sample was quantitatively analyzed according to grain size and $CaCO_3$ content. Size analysis was carried out utilizing a nest of 9 sieves selected for coincidence with the Wentworth (1922) grain size nomenclature (see H-2-38989). The $CaCO_3$ content of each sample was determined utilizing a semiquantitative CO_2 displacement method (Horwitz, 1970). Size and $CaCO_3$ data was input into the Rocksan Computer Program (Parr, 1974) which categorized each sediment sample into 1 of 19 classes (classification scheme modified after Folk, 1968; see H-2-38989). After analysis, each sample was visually examined to aid in further characterization. Each sample was subsequently stored in the Hanford Well Library for future reference.

For convenience of usage, the geologic maps were prepared at the same scale (1" = 16') as drawing H-2-36947 (Wells in 241-TY Farm As-built). Steps outlining the preparation of the maps are listed in Figure 1.

GENERALIZED GEOLOGY

Included within this section is a brief discussion of the geology underlying the 241-TY Tank Farm. The stratigraphic descriptions included, along with the Glossary (see page 12), are designed only to provide sufficient information to permit a general understanding of the Tank Farm maps presented. For a more detailed discussion of the regional geologic setting of the 241-TY Tank Farm, the reader is referred to articles listed in the Selected References (see page 14).

The 241-TY Tank Farm is underlain by four major stratigraphic units (see Figure 2); (1) basalt of the Columbia River Group which forms the bedrock beneath the area; (2) semiconsolidated sediments of the Ringold Formation which directly overlie the bedrock; (3) unconsolidated eolian silt; and

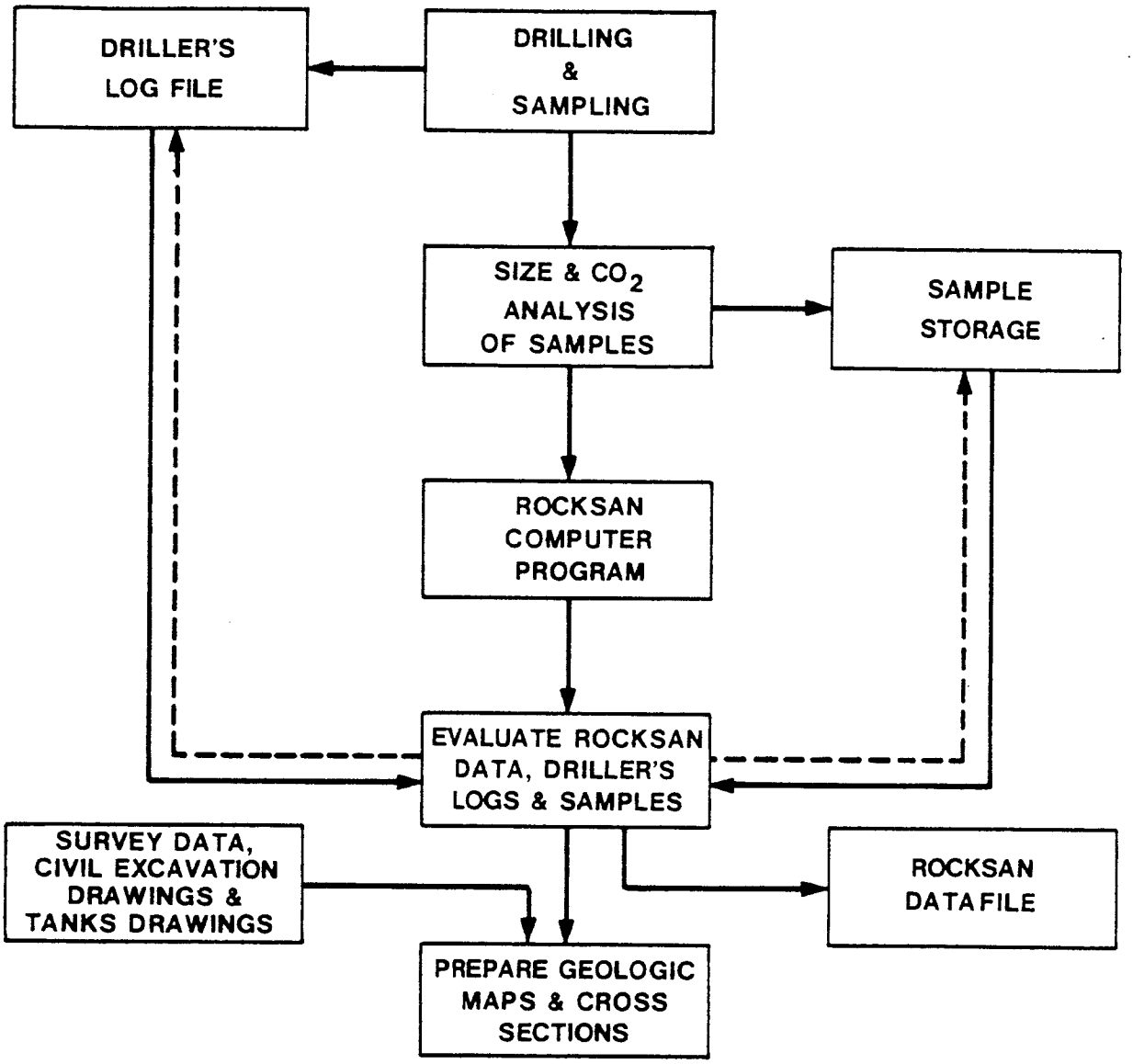

FIGURE 1

STEPS OUTLINING THE PREPARATION OF TANK FARM GEOLOGY MAPS

ERA	PERIOD	EPOCH	YEARS B. P.	STRATIGRAPHIC NAME AND/OR UNIT		LITHOLOGY DESCRIPTION
CENOZOIC	QUATERNARY	MODERN	30	BACKFILL		VERY POORLY SORTED GRAVEL, SAND & SILT
		PLEISTOCENE		GLACIOFLUVIAL SEDIMENTS		FAIRLY WELL SORTED FLUVIAL SAND & SILT WITH SOME GRAVEL
				EOLIAN SILT		FINE SAND & SILT DERIVED FROM THE UPPER RINGOLD
	TERTIARY	PLIOCENE	1,000,000	RINGOLD FORMATION	UPPER RINGOLD	WELL SORTED FLUVIAL OR LACUSTRINE SILT & SAND WITH SOME CALCAREOUS LAYERS
					MIDDLE RINGOLD	FLUVIAL GRAVEL & SAND VARIABLY CEMENTED WITH CALCIUM CARBONATE & SILICA
		MIOCENE	11,000,000	COLUMBIA RIVER BASALT GROUP	ELEPHANT MOUNTAIN MEMBER	DENSE BLACK EXTRUSIVE IGNEOUS ROCK, MICRO VESICULAR, BRICK BAT ENTABULATURE & NO COLUMNADE
					RATTLESNAKE RIDGE MEMBER	TUFFACEOUS SANDSTONE
					POMONA MEMBER	DENSE BLACK EXTRUSIVE IGNEOUS ROCK, SCATTERED OLIVINE PHENOCRYSTS, UPPER & SOMETIMES BASAL ENTABLATURE WELL DEVELOPED, FAN JOINTING IN COLUMNADE

WHP/KRF 1976

FIGURE 2

GENERALIZED STRATIGRAPHIC COLUMN FOR
THE 200 AREA TANK FARMS

(4) unconsolidated sand, silt, and gravel, collectively termed glaciofluvial sediments, which directly overlie the eolian silt. A more detailed description of the character of these units underlying the Tank Farm follows.

COLUMBIA RIVER BASALT GROUP

About 20 million years ago a series of fissures opened around the periphery of the subsiding Pasco Basin and large volumes of basaltic lava poured out over the land surface. The highly fluid lava was extruded intermittently from these fissures until approximately 8 million years ago. At the cessation of Columbia River Basalt volcanism, the basin had been filled with more than 12,000 feet of basalt.

The surface of the Columbia River Basalt lies beneath 241-TY Tank Farm at an elevation of 187 feet (all elevations based on feet above mean sea level measured at approximate center of Tank Farm). On the 241-TY Tank Farm maps, this surface occurs approximately 185 feet below the bottom border of the prepared cross sections.

RINGOLD FORMATION

Following the cessation of Columbia River Basalt volcanism the ancestral Columbia River transported sediments from the surrounding highlands into the Pasco Basin where they accumulated to form the Ringold Formation. Beneath the Hanford Reservation, this formation is up to 1200 feet thick and can generally be divided into three units on the basis of lithology; the clays and silts of the lower Ringold unit; the pebbles and cobbles of the middle Ringold unit; and the silts and fine sands of the upper Ringold unit.

Within the region beneath 241-TY Tank Farm, the lower Ringold unit is missing. The combined thickness of the middle and upper Ringold units present is approximately 397 feet.

Middle Ringold

Beneath the 241-TY Tank Farm, the 345-foot thick middle Ringold unit lies unconformably on the Columbia River Basalt and dips to the southeast about 50 feet per mile. The unit consists predominantly of well-rounded pebbles and cobbles with the interstitial spaces filled with medium to fine sand and silt cemented in places with SiO_2 or $CaCO_3$. Table III summarizes the grain size and $CaCO_3$ values of the middle Ringold sediments.

TABLE III

TYPICAL SIEVE AND CALCIUM CARBONATE VALUES FOR MAJOR MIDDLE RINGOLD LITHOLOGIES BENEATH 241-TY TANK FARM

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Sandy Gravel	77	2	3	4	9	5	1	0.3
Cemented Calcareous to Siliceous Slightly Silty Sandy Gravel	70	4	6	6	8	5	1	0-12.0
Coarse to Medium Sand	1	9	26	36	15	10	4	1.0
Cemented Calcareous to Siliceous Slightly Silty Sandy Gravel	67	8	7	6	6	5	2	0-12.0

The lower portion of the middle Ringold unit (elevation 185-283 feet) is blue-gray in color suggesting that the sediments have not undergone oxidation and have continuously been below the water table since their deposition. In contrast, sediments of the middle Ringold unit above the 238-foot elevation level have undergone oxidation as evidenced by their gray-brown color and their well developed weathering rinds.

Although the middle Ringold unit consists predominantly of pebbles and cobbles, a few sand units up to 17 feet in thickness occur beneath 200 West Area. Such units represent either lacustrine or fluvial deposits

layed down during periods of decreased velocity of the ancestral Columbia River. An example of one such unit is found beneath the 241-TY Tank Farm at an elevation of 424 feet.

Upper Ringold

The upper Ringold unit, which overlies the middle Ringold unit, occurs between elevations 530 and 562 feet. The unit consists predominately of well sorted fine sands and silts. These sediments, like the sand units of the middle Ringold, are representative of a period of decreased velocity of the ancestral Columbia River or temporary ponding. Table IV summarizes the grain size and $CaCO_3$ values of the upper Ringold unit.

TABLE IV

TYPICAL SIEVE AND CALCIUM CARBONATE VALUES FOR MAJOR UPPER RINGOLD LITHOLOGIES BENEATH 241-TY TANK FARM

		% Sand						
Lithology	%Pebbles & Cobbles	Very Coarse	Coarse	Medium	Fine	Very Fine	%Silt & Clay	$\%CaCO_3$
Calcareous Sandy Silt	0	0	2	6	8	20	64	11.0
Medium to Fine Sand	0	2	4	33	29	15	16	1.8
Cemented Calcareous Sandy Silt	0	0	3	14	16	15	52	14.0
Silty Fine to Very Fine Sand	0	4	6	13	18	21	38	2.5

EOLIAN SILT DEPOSIT

After deposition of the upper Ringold, the top of the unit was subjected to subaerial erosion. The surface of the unit was altered by wind which winnowed, reworked, and redeposited the fine grained sands and silts. These wind-deposited sediments, termed Early Palouse soil or eolian silt, occur beneath the 241-TY Tank Farm between elevations 562 and 579 feet. Table V summarizes the grain size and $CaCO_3$ content of the eolian silt.

TABLE V

TYPICAL SIEVE AND CALCIUM CARBONATE VALUES FOR 241-TY TANK FARM EOLIAN SILT LITHOLOGIES

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Silty Very Fine Sand	0	2	3	13	21	23	39	2.1
Sandy Silt	0	1	2	11	14	21	51	2.1

CALICHE DEPOSITS

After the deposition of the eolian silt, the climate was arid as indicated by two layers of $CaCO_3$ (caliche) found near the top of the upper Ringold unit. The strongest developed caliche layer beneath the 241-TY Tank Farm is found between elevations 538 and 544 feet. A less developed layer beneath the Tank Farm is located between elevations 556 and 562 feet (see $CaCO_3$ values in Table IV).

GLACIOFLUVIAL DEPOSITS

During the close of the Ice Age, approximately 20,000 years ago, a continental ice sheet covered much of northern Washington. As the ice sheet retreated northward, the breakup of ice dams resulted in catastrophic floods in which large volumes of glacial meltwater were released. During one of these floods, over 500 cubic miles of water is estimated to have poured into the Pasco Basin at a rate of more than 9 cubic miles of water per hour. Sediments deposited within the basin by such flooding now comprise the glaciofluvial unit. The characteristic variability of sediment size and degree of sorting within this unit can be attributed to changes in water velocity and water level which occurred during the flooding process.

Glaciofluvial deposits are found beneath the 241-TY Tank Farm between elevations 579 and 626 feet. The 47-foot thick section of these deposits consists predominently of coarse to medium sand with some silt and pebbles. Table VI summarizes the grain size and $CaCO_3$ values of the glaciofluvial sediments.

TABLE VI

TYPICAL SIEVE AND CALCIUM CARBONATE VALUES FOR MAJOR GLACIOFLUVIAL LITHOLOGIES BENEATH 241-TY TANK FARM

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Coarse to Medium Sand to Slightly Silty Coarse to Medium Sand	3	12	26	28	12	7	11	1.5
Slightly Pebbly Coarse to Medium Sand	8	15	27	26	11	7	6	1.7
Silty Medium to Very Fine Sand	0	4	11	17	10	16	42	2.1

CLASTIC DIKES

Throughout the Pasco Basin, clastic dikes are found cross-cutting the Ringold Formation and glaciofluvial sediments. These dikes, which range from a few inches to several feet in width, are known to exist to depths of more than 100 feet below the ground surface. Generally, the dikes are composed of fine silts to coarse sands. The origin of the clastic dikes is still in refute and will not be discussed here (see Selected References). Identification of clastic dikes by drilling is difficult and although some dikes were detected in the 241-TY Tank Farm, they could not be mapped.

BACKFILL MATERIAL

In preparation for tank construction, glaciofluvial material was excavated at the 241-TY Tank Farm site. This material, consisting predominantly of cobbles, pebbles, and coarse to medium sands to silts, was subsequently used as backfill from the base of the completed tanks (626 feet) to the ground surface (671 feet). An inherent characteristic of the backfill is its poor sorting. Grain size and $CaCO_3$ values for the backfill are found in Table VII.

TABLE VII

TYPICAL SIEVE AND CALCIUM CARBONATE VALUES FOR THE 241-TY TANK FARM BACKFILL

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Silty Sandy Gravel	53	11	11	9	6	4	6	1.5

WATER TABLE

The water table beneath the 241-TY Tank Farm is located within the middle Ringold unit at an elevation of 472 feet, 154 feet below the base of the tanks. For further information concerning contours on the water table beneath 200 West Area the reader is referred to drawings H-2-38397 (200 West Area Water Table Map) and H-2-38877 (200 West Area Depth to Water Map).

GLOSSARY

Basalt. Fine-grained, dark-colored, extrusive igneous rock.

Calcareous. Containing calcium carbonate.

Caliche. Gravel, sand, or silt cemented by calcium carbonate.

Cement. Chemically precipitated material occurring in the interstices between particles of gravel, sand, or silt.

Clastic. A textural term applied to rocks composed of fragmental material derived from pre-existing rocks.

Clastic dike. A tabular body of clastic material transecting the bedding of a sedimentary formation, representing extraneous material that has invaded the containing formation along a crack.

Dip. The angle at which a stratum or any planar feature is inclined from the horizontal.

Eolian. A formation formed by, or deposited from, the wind or currents of air.

Fluvial. Produced by the action of a river or stream.

Formation. The ordinary unit of geologic mapping consisting of a large and persistent stratum of some one kind of rock.

Glaciofluvial. Pertaining to streams flowing from glaciers or to the deposits made by such streams.

Grain. The particles or discrete crystals which comprise a rock or sediment.

Group. A local or provincial subdivision of a series, based on lithologic features and contains two or more formations.

Lacustrine. A formation deposited in a lake environment.

Lava. Fluid rock such as that which issues from a volcano or a fissure in the earth's surface and the same material solidified by cooling.

Lithology. The description of rocks or sediments on the basis of such characteristics as color, minerologic composition and grain size.

Sediment. Descriptive term for gravel, sand, and silt transported from their sources and deposited by air, water, or ice.

Sieve. A utensil having many small perforated openings, used to separate fine particles from coarser ones.

Siliceous. Containing silica.

Silt. Fine grained material between sand and clay in size.

Sorting. The grain size range of the sediments.

Stratigraphy. The part of descriptive geology of an area that pertains to the discrimination, character, thickness, sequence, age and correlation of the sediments and rocks of the area.

Subaerial. Formed, existing, or taking place on the land surface.

Unconformity. A surface of erosion or nondeposition that separates younger strata from older strata.

Water table. The upper surface of a zone of saturation except where that surface is formed by an impermeable body.

Winnowing. Separation of fine particles from coarser ones by wind action.

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1 - WELL DESIGNATION
WELL NUMBERS PREFIXED BY 299-

PLOT PLAN VIEW

W23-98 / 41-08-04 — HANFORD WELL NUMBER; COMPUTER NUMBER

CROSS-SECTION VIEW

COMPUTER NUMBER; HANFORD WELL NUMBER — W23-98 41-08-04; W23-99 (3' SOUTH) 41-08-06

SOLID LINE ON CROSS-SECTION.
DASHED LINE WHEN PROJECTED TO CROSS-SECTION: DISTANCE AND DIRECTION FROM CROSS-SECTION ARE GIVEN.

2 - COORDINATES
BASED ON HANFORD COORDINATE SYSTEM.

3 - PLANE OF CROSS-SECTION

PLOT PLAN VIEW — N43967, A, A'

CROSS-SECTION VIEW — A, GROUND SURFACE

4 - TANK DESIGNATION
TANKS PREFIXED BY 241-

5 - CONTACT BETWEEN LITHOLOGIES
SOLID LINE WHERE ACCURATELY KNOWN
DASHED LINE IF APPROXIMATELY KNOWN
QUERIED DASHED LINE WHERE INFERRED
BASE OF BACKFILL

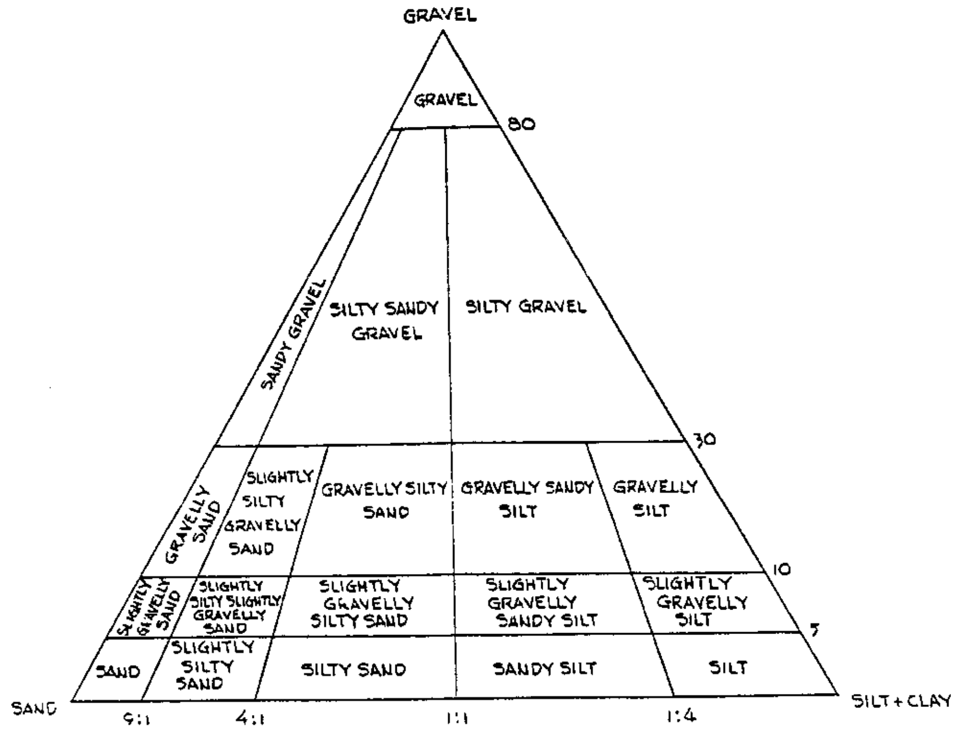
6 - LENSES OR STRINGERS
DISCONTINUOUS SEDIMENTS LESS THAN TWO FEET THICK
DISCONTINUOUS SEDIMENTS GREATER THAN TWO FEET THICK

7 - WATER TABLE
CROSS-SECTION VIEW — WATER TABLE (12/75) DATE WATER LEVEL MEASUREMENTS TAKEN
DATUM - MEAN SEA LEVEL

8 - HORIZONTAL AND VERTICAL SCALES
VERTICAL EXAGGERATION - 1X
VERTICAL SCALE - FEET ABOVE MEAN SEA LEVEL
20 10 0 10 20 30 40 50
1:920

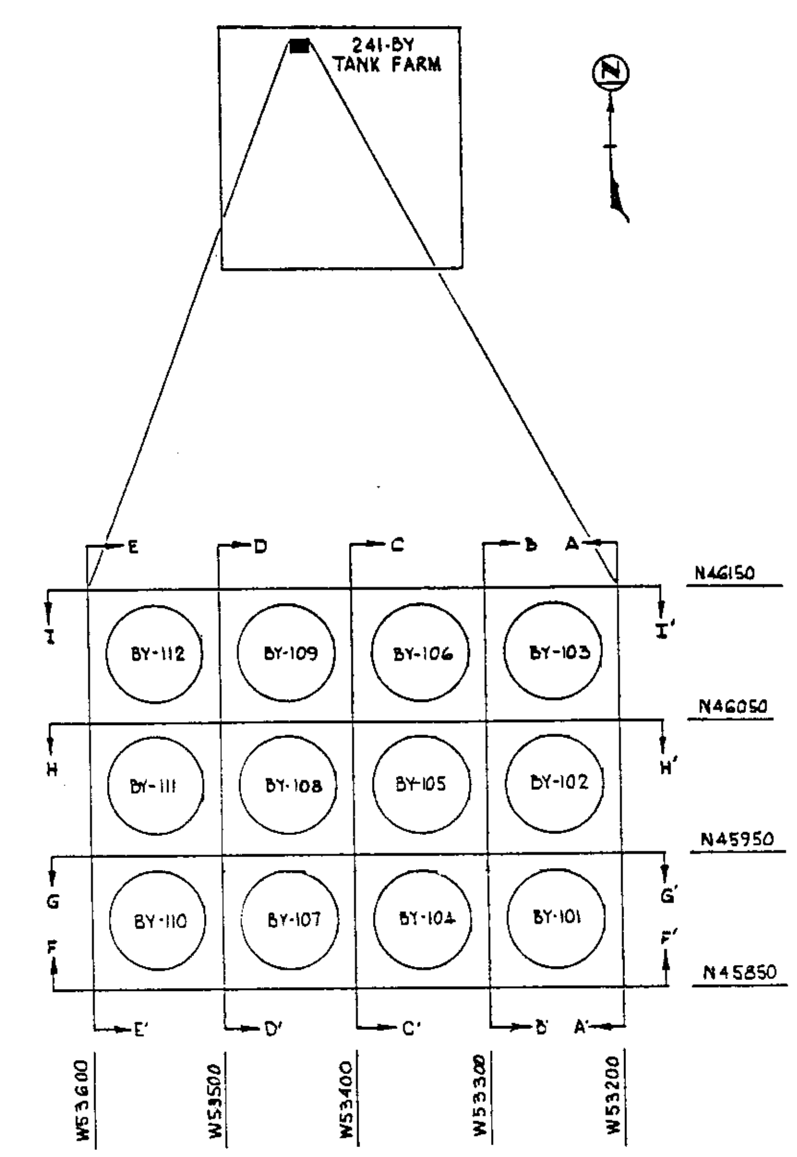
9 - SEDIMENT DESCRIPTION
SEDIMENTS BENEATH THE TANK FARMS ARE CLASSIFIED ON THE BASIS OF ONE OF NINETEEN SEDIMENT TYPES (SEDIMENT CLASSIFICATION). FURTHER DETAIL IS GIVEN USING MODIFIERS FROM THE GRAIN SIZE NOMENCLATURE. SEDIMENTS WITH CHEMICALLY PRECIPITATED MATERIALS OCCURRING IN THE INTERSTICES BETWEEN GRAINS ARE PREFIXED BY THE TERM CEMENTED. SEDIMENTS WITH GREATER THAN 10% CALCIUM CARBONATE ARE PREFIXED BY THE MODIFIER CALCAREOUS. SEDIMENTS CONTAINING SILICA IN THE INTERSTICES BETWEEN GRAINS ARE MODIFIED BY THE TERM SILICEOUS.

SEDIMENT CLASSIFICATION (MODIFIED AFTER R.L.FOLK, 1968)



GRAIN SIZE NOMENCLATURE (MODIFIED AFTER C.K.WENTWORTH, 1922)

PARTICLE DESIGNATION			PARTICLE DIAMETER (MM)
GRAVEL	BOULDER		>256
	COBBLE	LARGE	256 - 128
		SMALL	128 - 64
	PEBBLE	VERY COARSE	64 - 32
		COARSE	32 - 16
		MEDIUM	16 - 8
		FINE	8 - 4
		VERY FINE	4 - 2
SAND		VERY COARSE	2 - 1
		COARSE	1 - 0.5
		MEDIUM	0.5 - 0.25
		FINE	0.25 - 0.125
		VERY FINE	0.125 - 0.0625
SILT + CLAY			<0.0625



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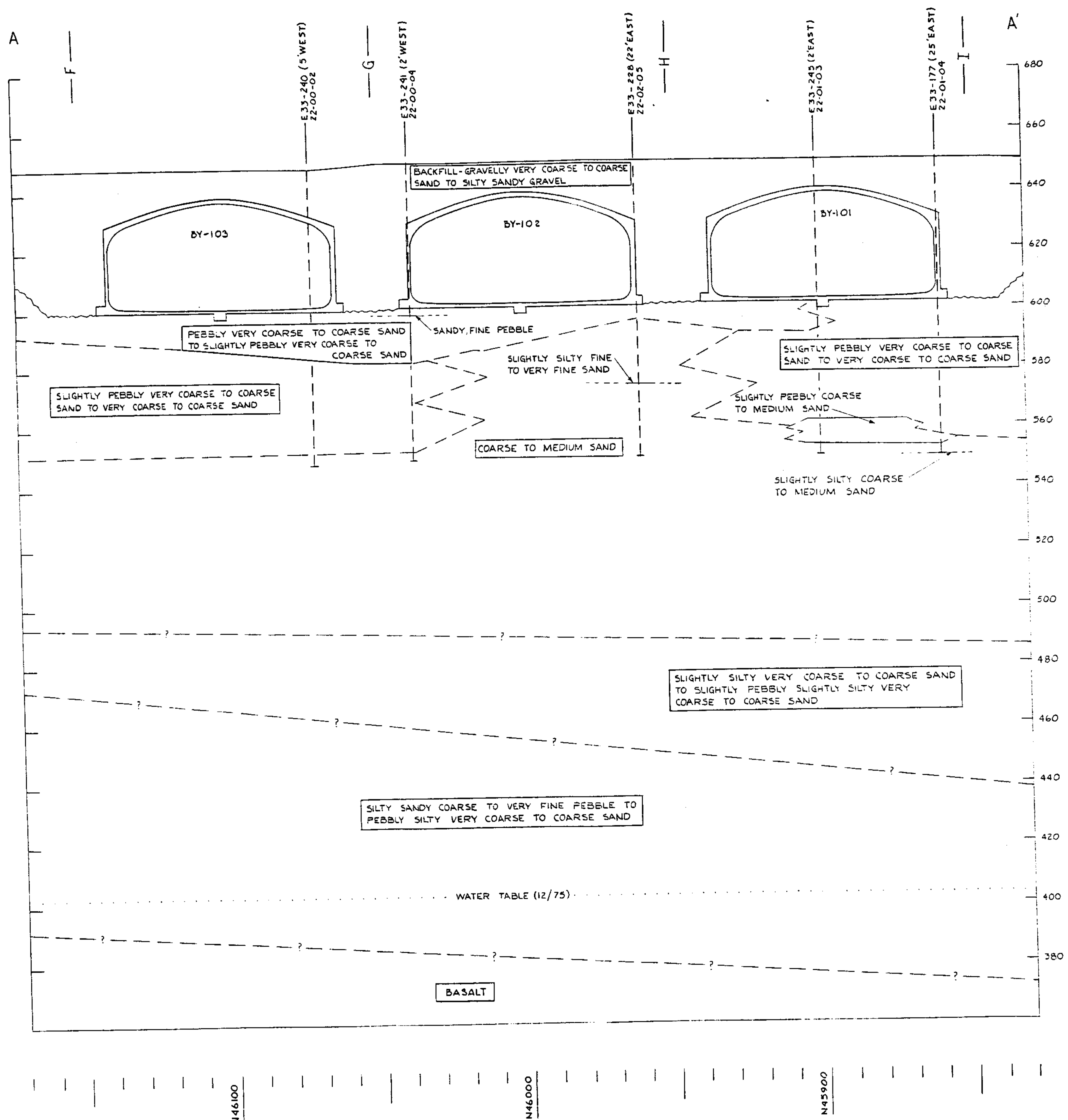
RICHLAND OPERATIONS OFFICE
VITRO ENGINEERING - a division of AUTOMATION INDUSTRIES, INC.

241-BY TANK FARM
GEOLOGIC MAP
LEGEND AND PLOT PLAN

DRAWN: ERICKSON
SCALE: NONE
CK-0065
241-BY
GEOLOGIC CHARACTERIZATION
0000
NOT REQUIRED
NONE
H-2-38982

REFERENCE DRAWINGS
REVISIONS
DRAWING STATUS
NEXT USED ON



CROSS-SECTION A-A'

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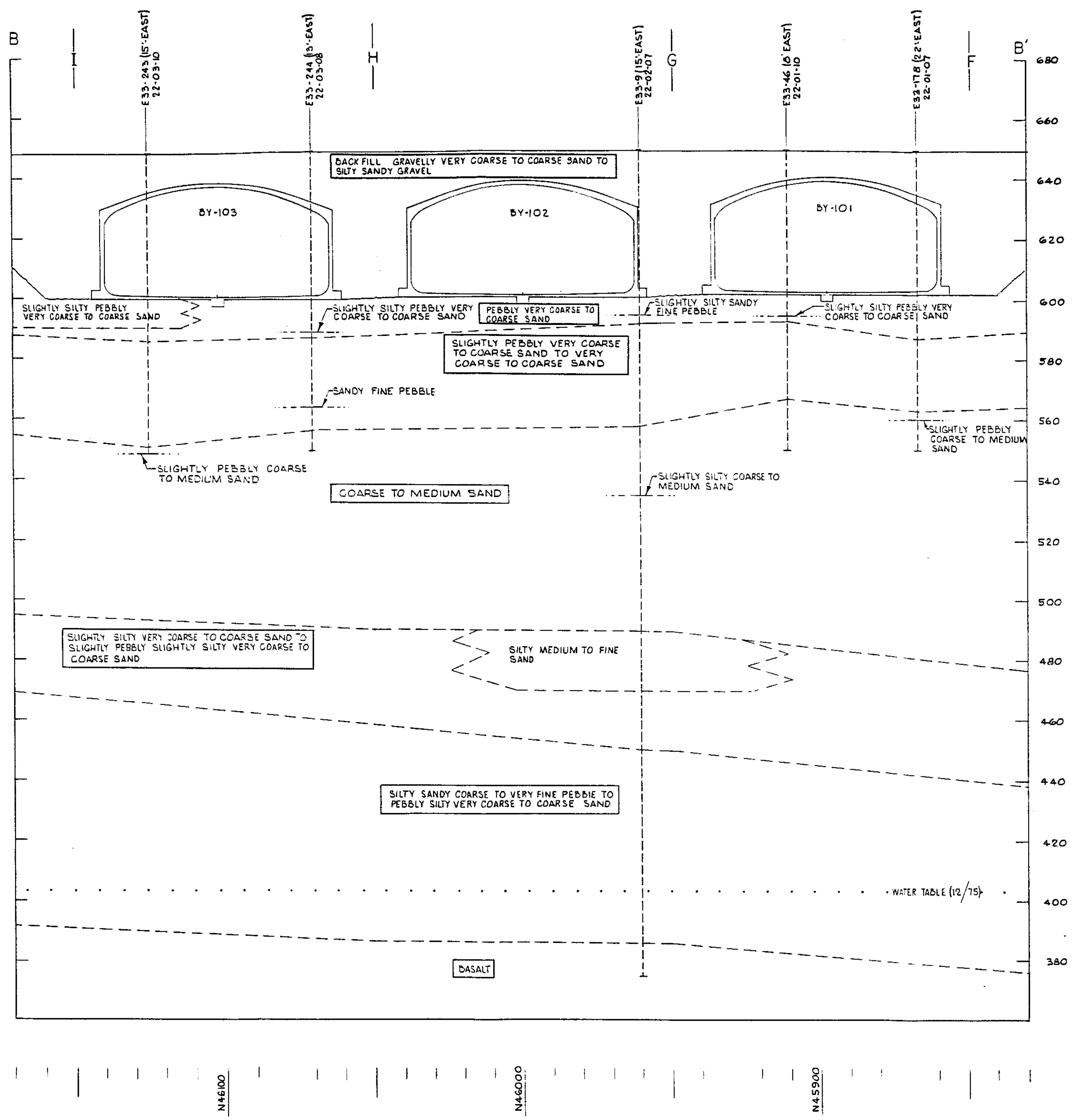
241-BY TANK FARM GEOLOGICAL CHARACTERIZATION CROSS-SECTION A-A'			
DRAWN: RON L. HURLEY 12-27-76			
SCALE: 1" = 16'	WO NO: CK0065	PROJ. TITLE: GEOLOGIC CHARACTERIZATION	
CLASSIFIED AS: NOT REQUIRED	241-BY	0402-#0501	
CLASSIFICATION: NONE	DWG NO: H-2-70486	—	—

REFERENCE DRAWINGS — NEXT USED ON

REVISIONS — DRAWING STATUS



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241 BY TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION B-B'

DRAWN: HODGSON
SCALE: 1" = 16'-0
CLASSIFIED BY: NOT REQUIRED
CLASSIFICATION: NONE
PROJ. NO. W.O. NO. CK 0065
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
BLDG. NO. 241-BY
INDEX NO. 0402 / 0501
DWG. NO. H-2-70487

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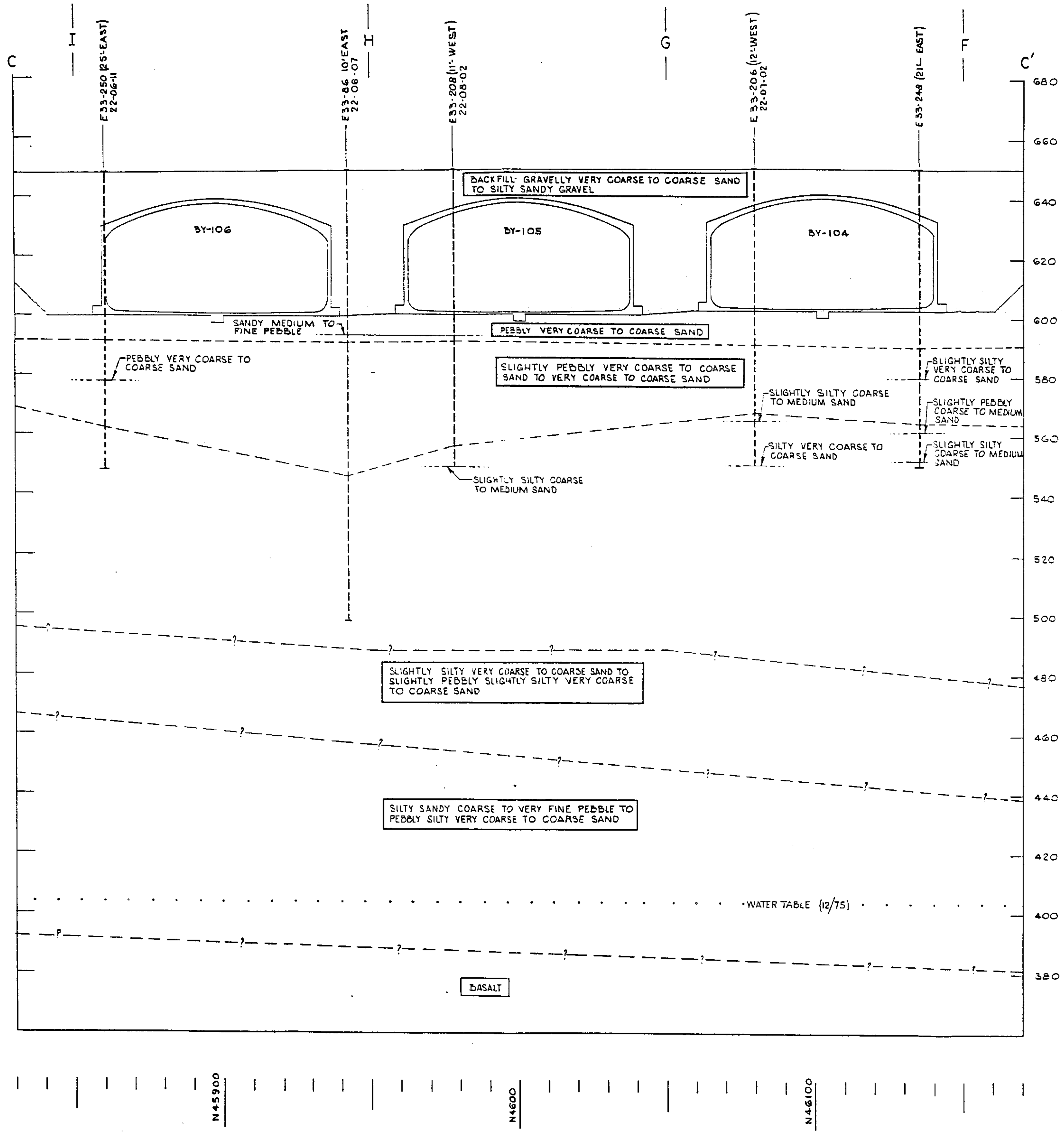
NEXT USED ON
REVISIONS
DRAWING STATUS
0



CROSS SECTION C–C′

DWG. NO.	DRAWING TITLE OR INDEX NO.
REFERENCE DRAWINGS	
NEXT USED ON	

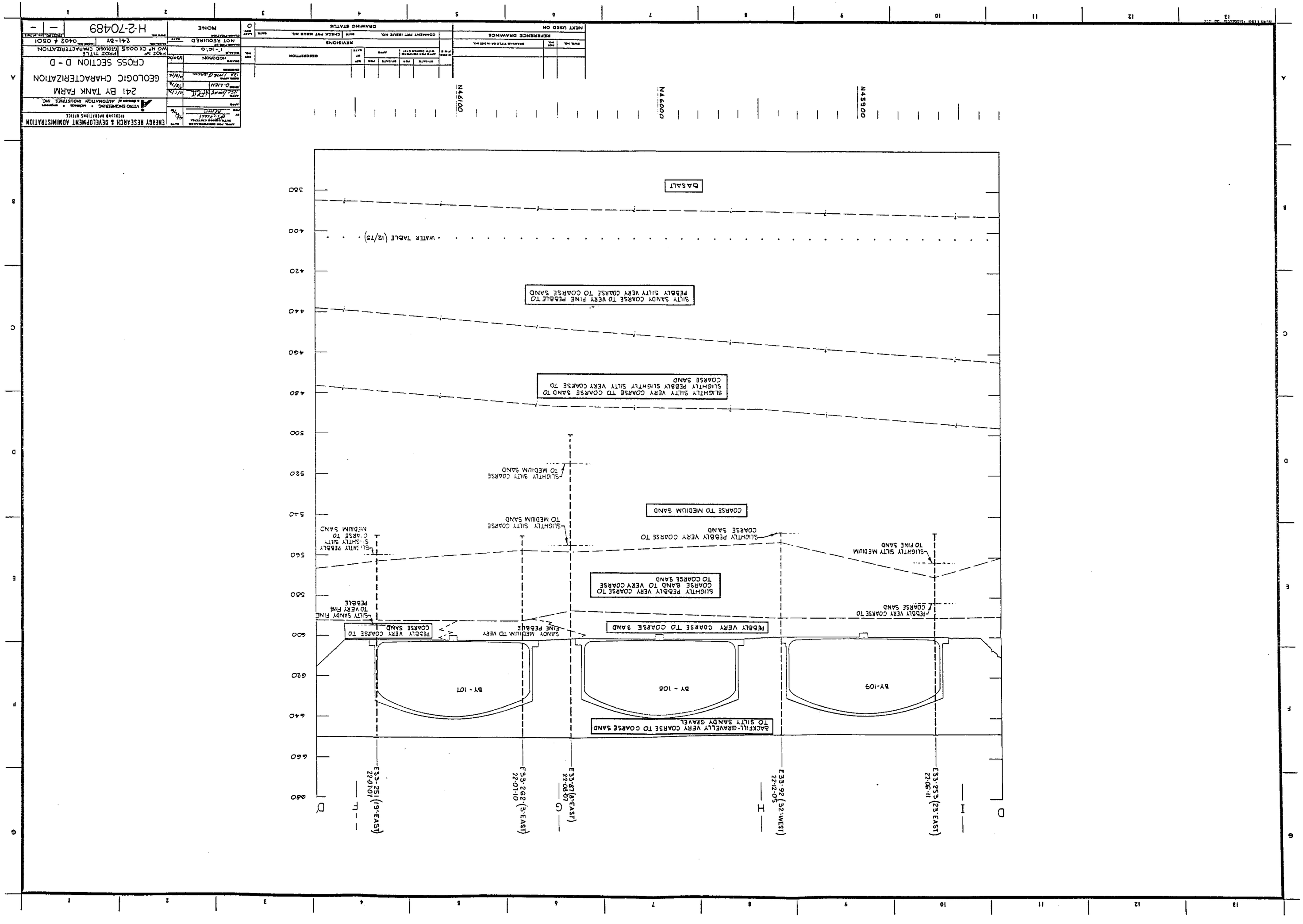
REVISIONS — DESCRIPTION — COMMENT PRT ISSUE NO. — CHECK PRT ISSUE NO. — DRAWING STATUS — 0

U. S. ATOMIC ENERGY COMMISSION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC

241-BY TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION C – C′

DRAWN: HODGSON 3/30/76
SCALE: 1" = 16'-0
PROJ. Nº / WO Nº CK0065
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
241-BY — 0402 6 0501
NOT REQUIRED
CLASSIFICATION: NONE
H-2-70488



NEXT USED ON	DRAWING STATUS		NONE
REFERENCE DRAWINGS	COMMENT PRT ISSUE NO. DATE / CHECK PRT ISSUE NO. DATE		
PANEL NO. / REV / DRAWING TITLE OR INDEX NO.	REVISIONS		
	BY DATE / DESCRIPTION / APPD / APPD / BY DATE / AS-BUILT WITH DRAWING CHG'S		
			H-2-70489

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
OAKLAND OPERATIONS OFFICE

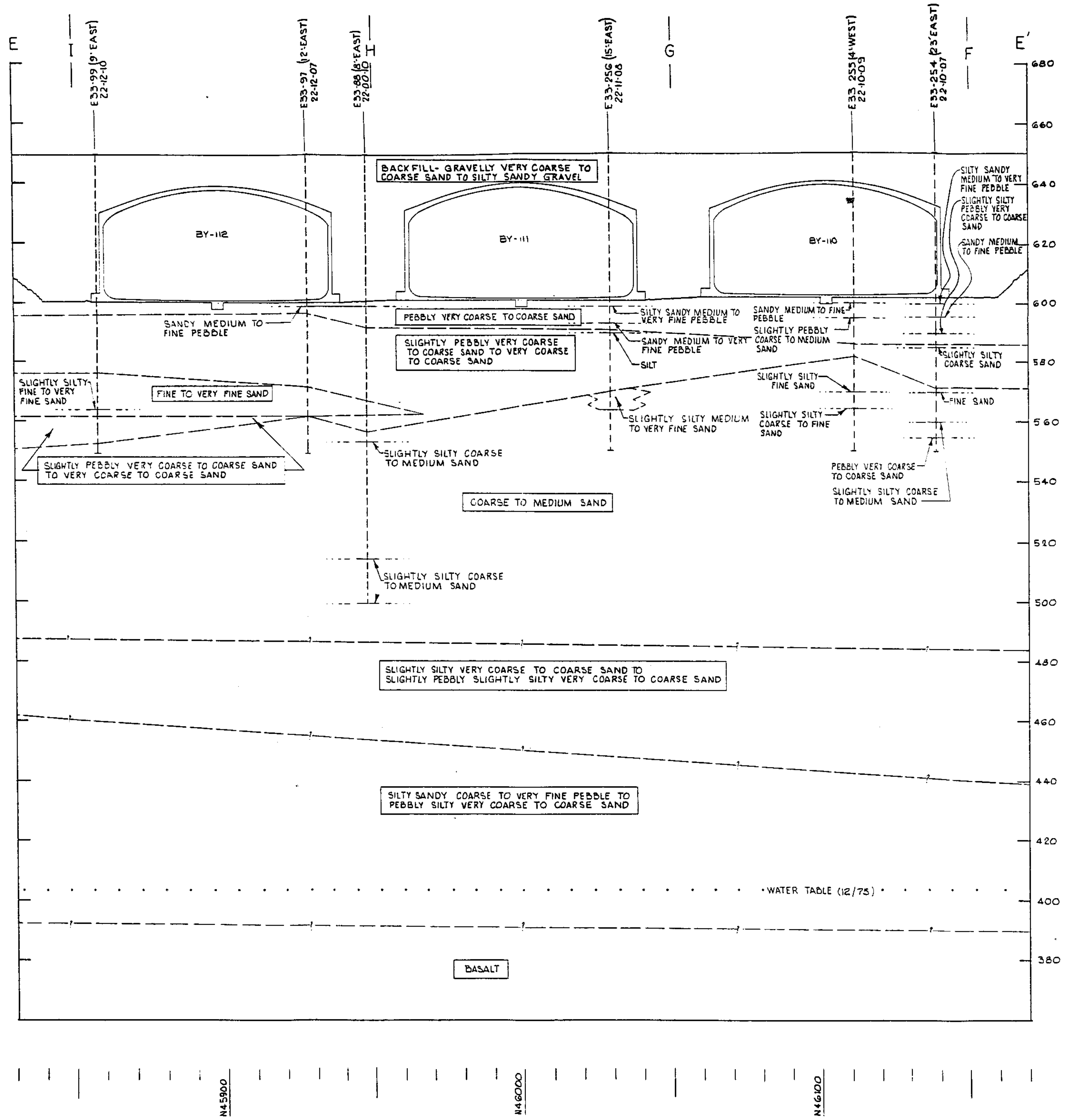
WITCO CHEMICAL • PETROLEUM SPECIALTIES DIVISION
A Division of WITCO CHEMICAL CORPORATION • NEW YORK

241 BY TANK FARM

GEOLOGIC CHARACTERIZATION

CROSS SECTION D - D

DRAWN	HODGSON	12/76	
SCALE	1" = 40'-0"		
CHECKED BY	NOT REQUIRED	DATE	
PROJ. NO.	0402 & 0501		
WO Nº	CX 0005		
DRAWING NO.	241-BY		
SHEET NO. OF	—	—	—



CROSS SECTION E - E'

DWG. NO.	REF. NO.	DRAWING TITLE OR VISIBLE NO.
REFERENCE DRAWINGS		
NEXT USED ON		

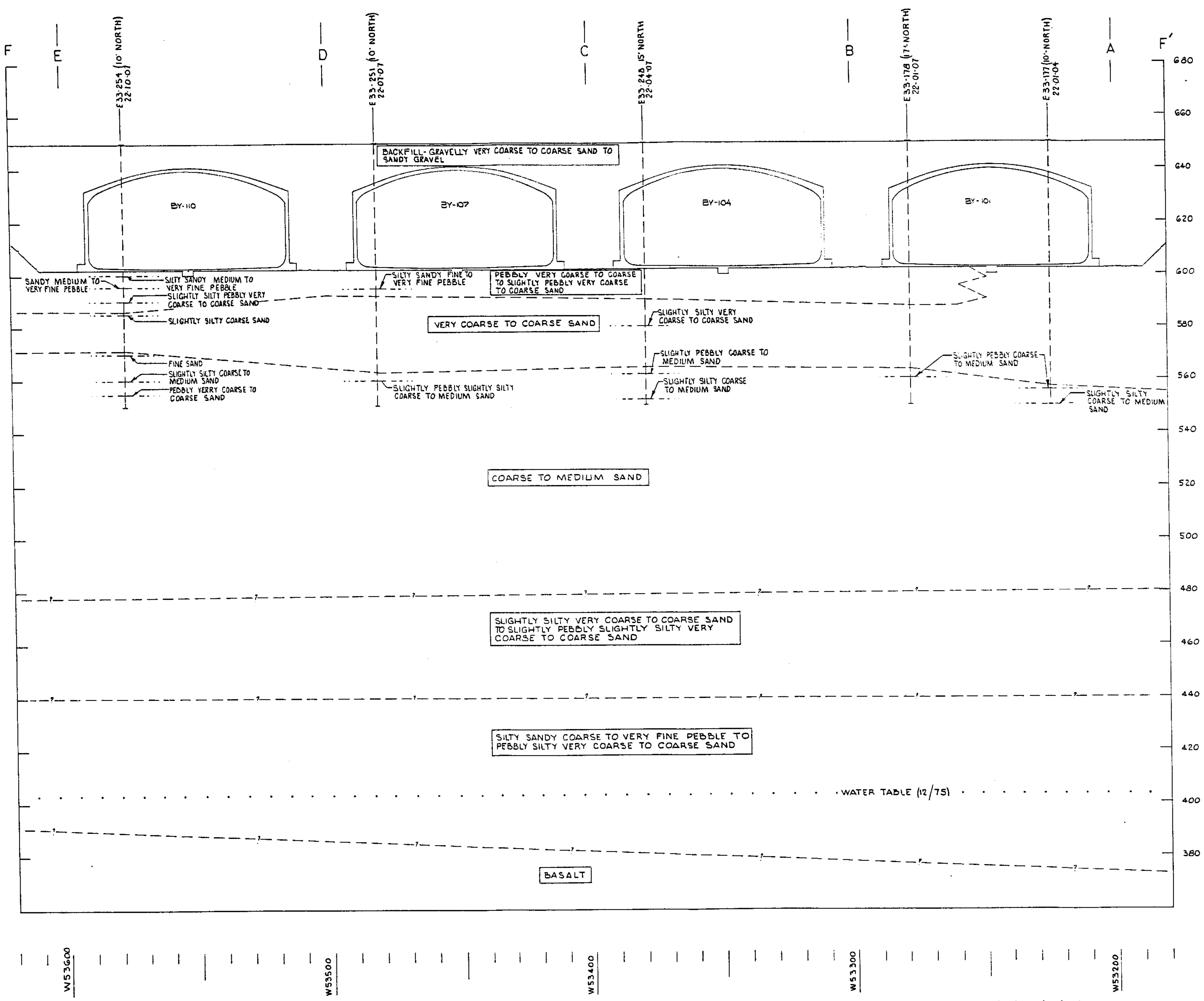
MICRO FILM	APPD FOR CONFORM WITH DESIGN CRIT	BY-DATE	APPD	BY-DATE	DATE	DESCRIPTION
				REVISIONS		
COMMENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE	LAST REV 0		
		DRAWING STATUS				

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241 BY TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION E - E'

DRAWN	HODGSON 4/1/76
SCALE	1" = 10'-0
CLASSIFIED BY	NOT REQUIRED
CLASSIFICATION	NONE
PROJ. NO.	
WO NO	CK0065
PROJ. TITLE	GEOLOGIC CHARACTERIZATION
BLDG. NO.	241-BY
INDEX NO.	0402 0501
DWG. NO.	H-2-70490



F
E
D
C
B
A
F'
E33-254 (10' NORTH) 22-10-01
E33-251 (10' NORTH) 22-07-07
E33-248 15' NORTH 22-04-07
E33-178 (17' NORTH) 22-01-07
E33-177 (10' NORTH) 22-01-04
BACKFILL- GRAVELLY VERY COARSE TO COARSE SAND TO SANDY GRAVEL
BY-110
BY-107
BY-104
BY-101
SANDY MEDIUM TO VERY FINE PEBBLE
SILTY SANDY MEDIUM TO VERY FINE PEBBLE
SLIGHTLY SILTY PEBBLY VERY COARSE TO COARSE SAND
SLIGHTLY SILTY COARSE SAND
SILTY SANDY FINE TO VERY FINE PEBBLE
PEBBLY VERY COARSE TO COARSE TO SLIGHTLY PEBBLY VERY COARSE TO COARSE SAND
VERY COARSE TO COARSE SAND
SLIGHTLY SILTY VERY COARSE TO COARSE SAND
FINE SAND
SLIGHTLY SILTY COARSE TO MEDIUM SAND
PEBBLY VERY COARSE TO COARSE SAND
SLIGHTLY PEBBLY SLIGHTLY SILTY COARSE TO MEDIUM SAND
SLIGHTLY PEBBLY COARSE TO MEDIUM SAND
SLIGHTLY SILTY COARSE TO MEDIUM SAND
SLIGHTLY PEBBLY COARSE TO MEDIUM SAND
SLIGHTLY SILTY COARSE TO MEDIUM SAND
COARSE TO MEDIUM SAND
SLIGHTLY SILTY VERY COARSE TO COARSE SAND TO SLIGHTLY PEBBLY SLIGHTLY SILTY VERY COARSE TO COARSE SAND
SILTY SANDY COARSE TO VERY FINE PEBBLE TO PEBBLY SILTY VERY COARSE TO COARSE SAND
WATER TABLE (12/75)
BASALT
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
W53600
W53500
W53400
W53300
W53200

CROSS SECTION F - F'

U. S. ATOMIC ENERGY COMMISSION	RICHLAND OPERATIONS OFFICE	
VITRO ENGINEERING • architects • engineers, a division of AUTOMATION INDUSTRIES, INC.		
241 BY TANK FARM	GEOLOGIC CHARACTERIZATION	CROSS SECTION F – F'
DRAWN: HODGSON	SCALE: 1" = 10'-0	NOT REQUIRED
PROJ N° / WO N° CK0065	PROJ TITLE: GEOLOGIC CHARACTERIZATION	241-BY
CLASSIFICATION: NONE	DWG NO. H-2-70491	

DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.

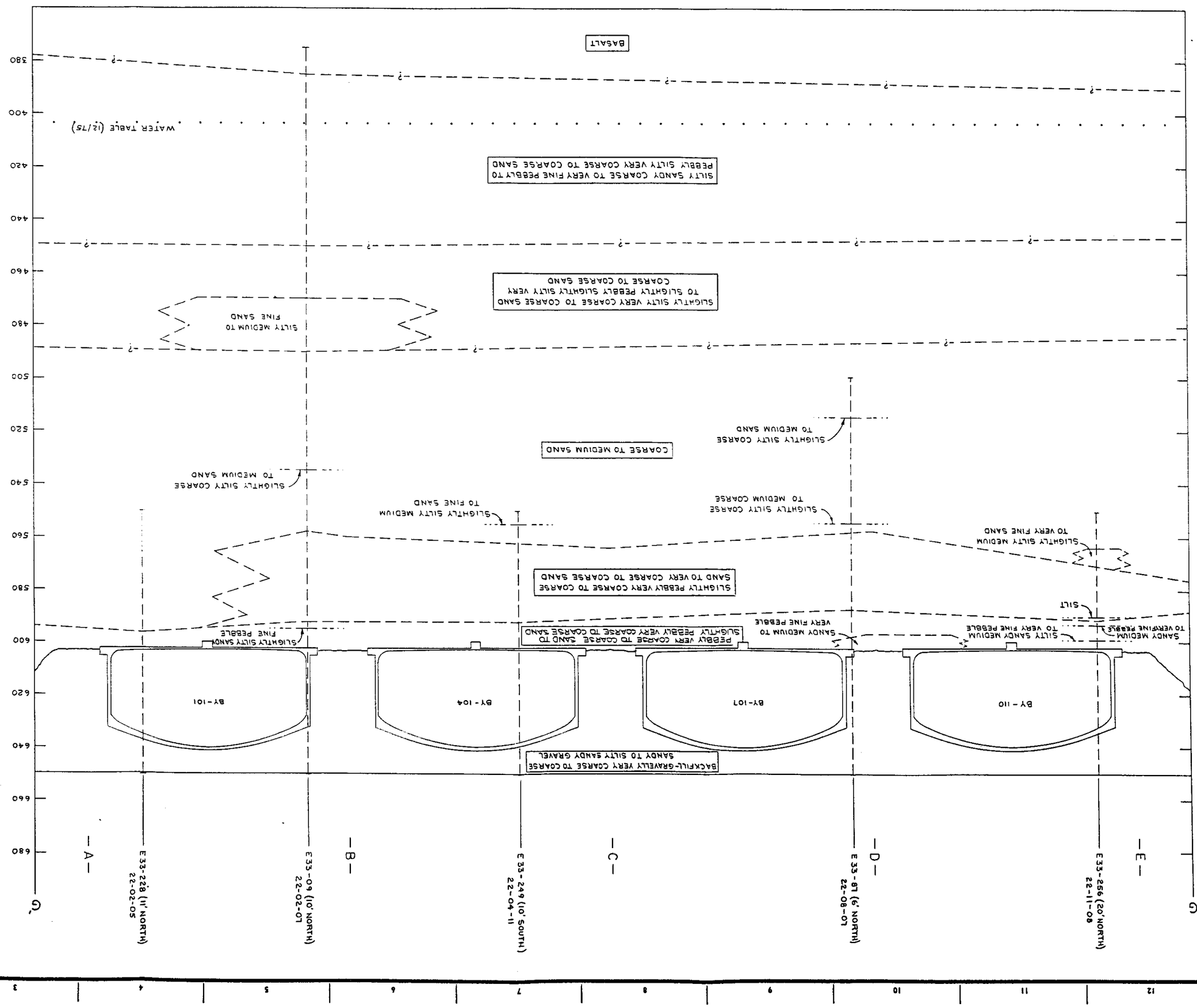
REFERENCE DRAWINGS

NEXT USED ON

REVISIONS

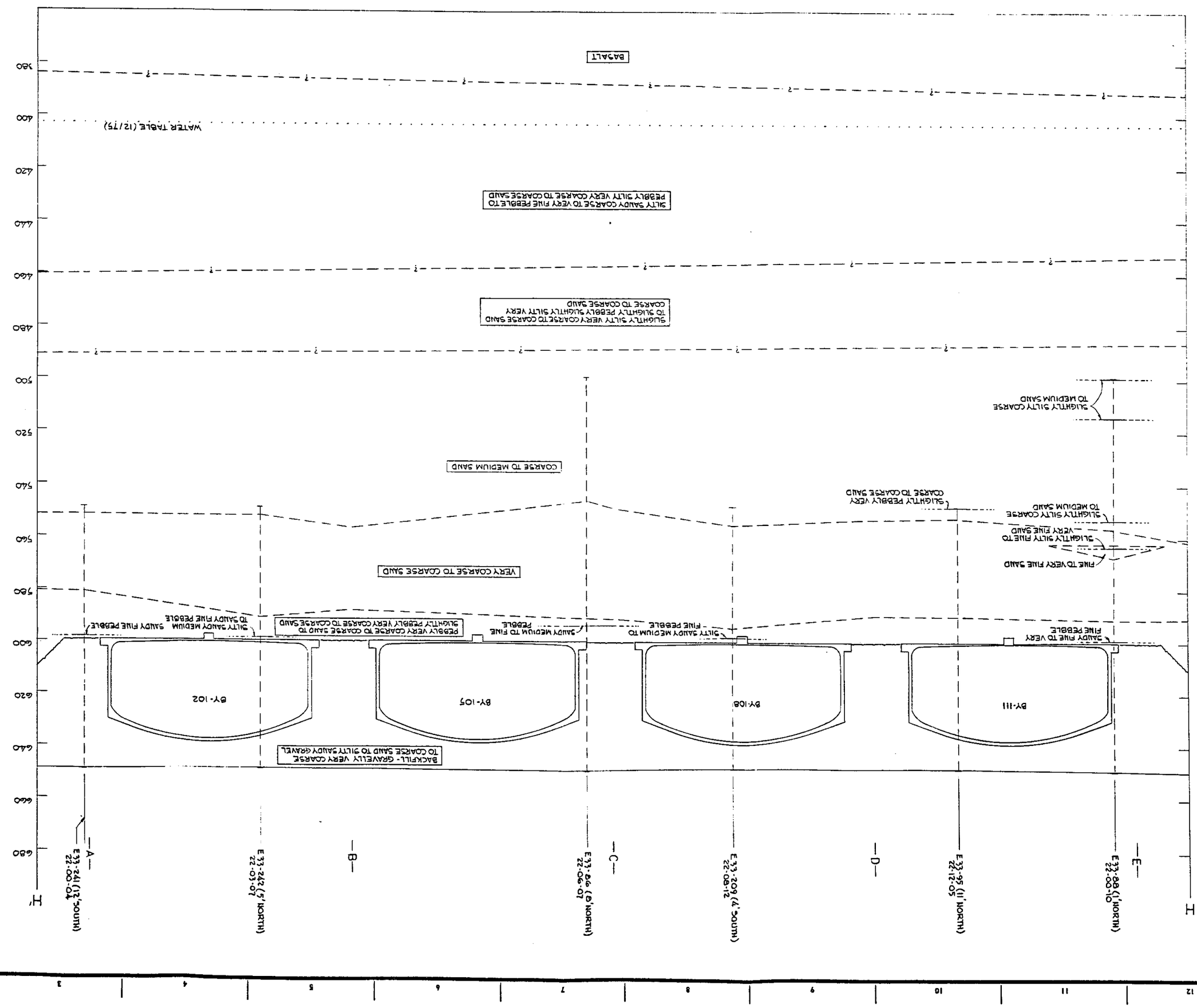
DRAWING STATUS

CROSS SECTION G-G'



ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION	NONE
RICHLAND OPERATIONS OFFICE	H-2-70492
VITRO ENGINEERING • Advanced • Responsive	
A Division of AUTOMATION INDUSTRIES, INC.	
241-BY TANK FARM	
GEOLOGIC CHARACTERIZATION	
CROSS SECTION G-G	
PROJ No.: CK0065 PROJ TITLE: GEOLOGIC CHARACTERIZATION	
W.O. No.: 0402.0001 241-BY	
DRAWN L.A.DUNTHORN 4-5-76	
SCALE 1" = 10'-0	
NOT REQUIRED	
REVISIONS	
DESCRIPTION	
DRAWING STATUS	
COMMENT PRT ISSUE NO.	
REFERENCE DRAWINGS	
NEXT USED ON	

Cross Section H-H'



ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

WYNN ENGINEERING • Architects • Engineers
A division of AUTOMATION INDUSTRIES, INC.

24i-BY TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION H-H'

DRAWN BY	D.J.LIN	11/79	
TRACED BY			
CHECKED BY			
APPROVED BY			
SCALE	1"=10'-0"		
DATE	11/79		

CK-0069	GEOLOGIC CHARACTERIZATION		
24i-BY		CA02.0701	
H-2-70493		–	–

NONE

NOT REQUIRED

NO.	DESCRIPTION	BY	DATE	APP'D BY	DATE

REVISIONS

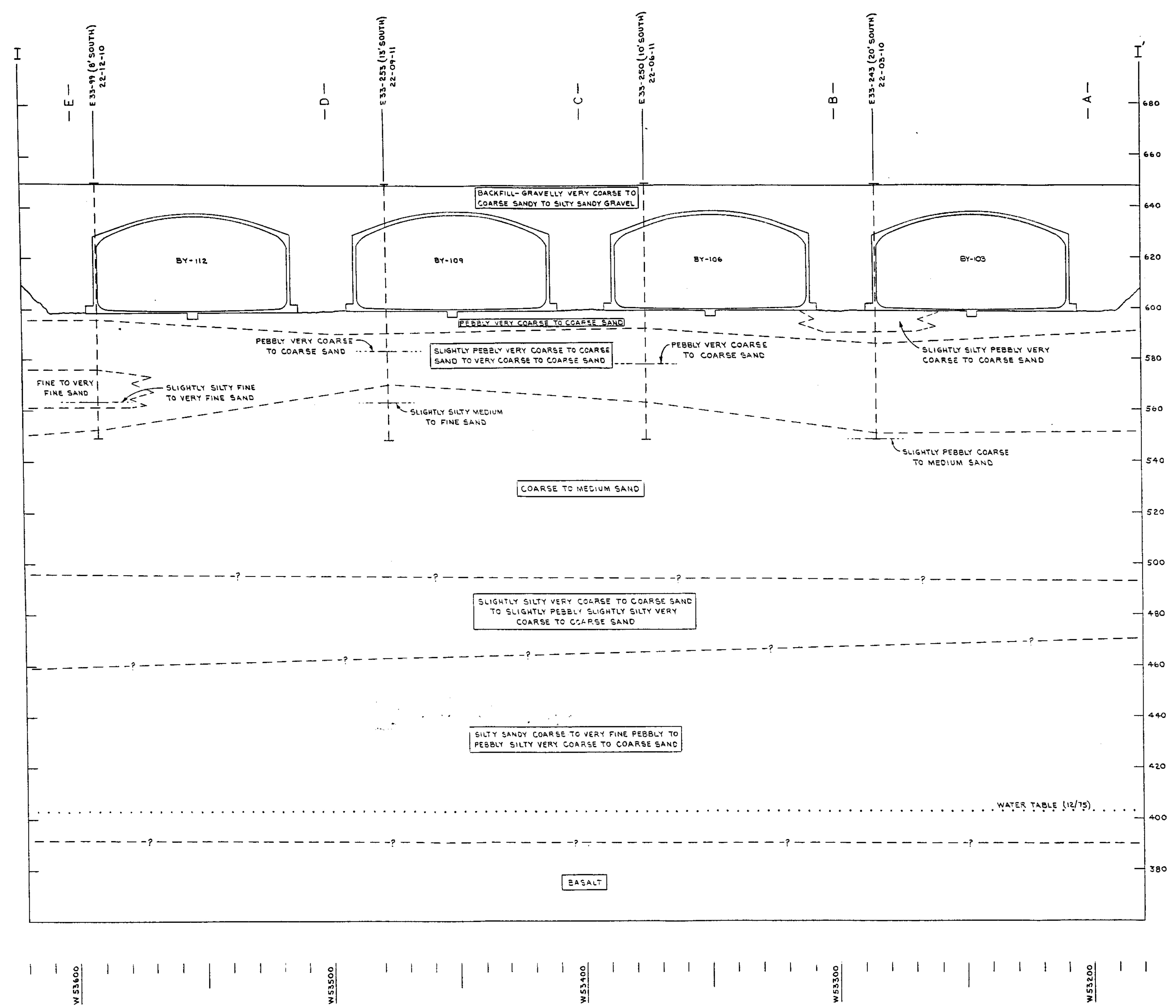
DWG. NO.	REV. NO.	DRAWING TITLE OR SHEET NO.

REFERENCE DRAWINGS

NEXT USED ON

CONCURRENT PART ISSUE NO. | CHECK PART ISSUE NO. | DATE

DRAWING STATUS



CROSS SECTION I-I'

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

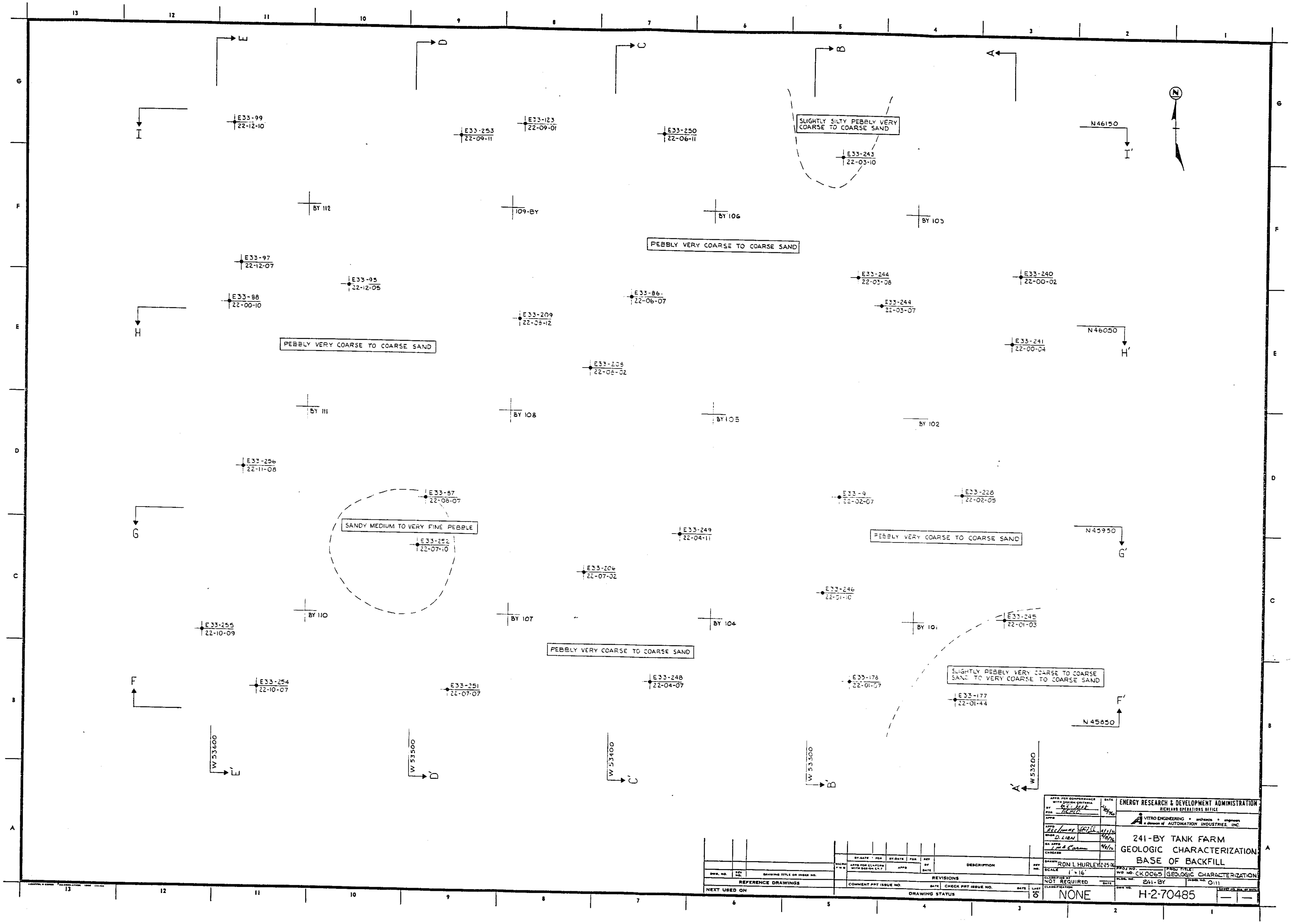
VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-BY TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION I-I'

DRAWN: L.A. DUNTHORN 4-6-76
SCALE: 1" = 16'-0"
PROJ. NO.: 1
W.O. NO.: 1CX0063
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
CLASSIFIED BY: NOT REQUIRED
241-BY
0402, 0501
CLASSIFICATION: NONE
H-2-70494

DWG. NO.	DOC NO.	DRAWING TITLE OR ISSUE NO.
REFERENCE DRAWINGS		
NEXT USED ON		

REVISIONS
DRAWING STATUS



PEBBLY VERY COARSE TO COARSE SAND
SANDY MEDIUM TO VERY FINE PEBBLE
SLIGHTLY SILTY PEBBLY VERY COARSE TO COARSE SAND
SLIGHTLY PEBBLY VERY COARSE TO COARSE SAND TO VERY COARSE TO COARSE SAND
E33-99 22-12-10
E33-123 22-09-01
E33-253 22-09-11
E33-250 22-06-11
E33-243 22-03-10
E33-97 22-12-07
E33-95 22-12-05
E33-88 22-00-10
E33-209 22-08-12
E33-86 22-06-07
E33-244 22-03-08
E33-244 22-03-07
E33-240 22-00-02
E33-241 22-00-04
E33-256 22-11-08
E33-87 22-08-07
E33-252 22-07-10
E33-249 22-04-11
E33-206 22-07-02
E33-9 22-02-07
E33-228 22-02-05
E33-246 22-01-10
E33-245 22-01-03
E33-255 22-10-09
E33-254 22-10-07
E33-251 22-07-07
E33-248 22-04-07
E33-176 22-01-07
E33-177 22-01-44
BY 112
109-BY
BY 106
BY 103
BY 111
BY 108
BY 105
BY 102
BY 110
BY 107
BY 104
BY 101
N46150
N46050
N45950
N45850
W 53600
W 53500
W 53400
W 53300
W 53200
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
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241-BY TANK FARM
GEOLOGIC CHARACTERIZATION
BASE OF BACKFILL
DRAWN RON L HURLEY 2-25-76
ENGR D. LIEN
SCALE 1" = 16'
WO NO. CK0065
PROJ TITLE: GEOLOGIC CHARACTERIZATION
CLASSIFIED BY NOT REQUIRED
BLDG. NO. 241-BY
INDEX NO. 0111
CLASSIFICATION NONE
DWG NO. H-2-70485
REFERENCE DRAWINGS
NEXT USED ON
REVISIONS
DRAWING STATUS